In this document, we present the results of an alternative model where age was included as a quadratic in the survival component of the joint models. The motivation for conducting this alternative model was to test a reviewer suggestion that age be included as a quadratic in our model. Although age was significant in the survival submodel as a quadratic, we chose not to include this alternative model in the manuscript. We believe that including age as reflected in our static risk variable, RoC\*RoI, was more consistent with an applied approach (what can supervision officers understand from change in dynamic risk, given an individual’s static risk). The class membership and longitudinal submodels are identical to those presented in the manuscript, whereas the survival submodel has two additional parameters (age and age2).

Including age as a quadratic in the survival submodel did not change the model selected or result in any substantial changes in the patterns of results.

# **Table 1.**

*DRAOR Acute Model Selection Criteria Derived From 60% Calibration Sample*

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Model | BIC | Max LL | CI Test Statistic | Relative Entropy | Mean Posterior Probability within Class (Percentage) | | | | | |
|  |  |  | 1 | 2 | 3 | 4 | 5 |  |
| DRAOR Acute |  |  |  |  |  |  |  |  |  |  |
| 2 classes | 167578.75 | -83705.5 | 2.52 | 0.49 | 0.86 (53.49) | 0.82 (46.51) |  |  |  |  |
| 3 classes | 167389.26 | -83587.88 | 50.37\* | 0.69 | 0.69 (14.2) | 0.72 (12.25) | 0.91 (73.55) |  |  |  |
| 4 classes | 167310.26 | -83525.51 | 4.32 | 0.63 | 0.76 (7.13) | 0.82 (47.88) | 0.83 (3.37) | 0.75 (41.63) |  |  |
| 5 classes | 167248.51 | -83471.75 | 6.20\* | 0.66 | 0.75 (8.98) | 0.84 (3.17) | 0.70 (34.36) | 0.85 (49.78) | 0.68 (3.71) |  |

*Note*. Calibration sample comprised 51633 observations of *N* = 2050 randomly selected participants. There were 787 recidivism events recorded in this sample.

DRAOR Acute= Dynamic Risk Assessment for Offender Re-entry (Serin, 2007), Acute subscale.

BIC indicates Bayesian information criterion. Max LL indicates maximum log-likelihood. CI test statistic indicates conditional independence test statistic.

\*indicates significant conditional independence test statistic

**Fig. 1**

|  |  |
| --- | --- |
|  |  |
| Predicted DRAOR Acute Trajectories for 60% Calibration Sample | Predicted DRAOR Acute Trajectories for 40% Test Sample |

Cross sample comparisons of identified trajectories. Calibration sample comprised of 51633 observations of *N* = 2050 randomly selected participants, with 787 recidivism events. Calibration sample comprised of 40312 observations of *N* = 1598 remaining participants, with 646 recidivism events.

**Fig. 2**

|  |  |
| --- | --- |
| ***A*** | ***B*** |
| ***C*** | ***D*** |
| *Mean group predicted trajectories of DRAOR Acute plotted with (****A****) and without (****B****) Monte Carlo confidence intervals, mean group survival curves (****C****) and group-specific baseline hazard rates (****D****).*  Predicted values from lcmm’s Jointlcmm function (see Proust-Lima et al., 2017, p. 22).  DRAOR Acute= Dynamic Risk Assessment for Offender Re-entry (Serin, 2007), Acute subscale. Scores range from 0 to 14 with higher scores indicating higher risk. | |

**Fig. 3**

|  |  |
| --- | --- |
| **A** | **B** |
| **C** | **D** |

Heavily weighted line represents predicted mean trajectories of DRAOR Acute for (**A)** *Moderate Decreasing*, (**B**) *Low Decreasing*, (**C**) *Rapid Decreasing*, and (**D**) *Increasing*. Unweighted lines represent 50 randomly selected individual sample trajectories within each group, jittered to reduce overlap.

Jittering increases readability, facilitating illustration of within-group noise, but creates appearance of oscillation, where scores may actually be constant across measurement occasions.

DRAOR Acute= Dynamic Risk Assessment for Offender Re-entry (Serin, 2007), Acute subscale. Scores range from 0 to 14 with higher scores indicating higher risk.

Descriptive Qualities of Four DRAOR Acute Trajectories

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Moderate Decreasing | | Low Decreasing | Rapid Decreasing | Increasing |  |
|  | N (%) | | | | |  |
| Number of Participants | | 1612 (44.21) | 1753 (48.08) | 177 (4.85) | 104 (2.85) |  |
|  | | Mean (SD) | | | | Kruskal-Wallis χ2 |
| Age | | 31.89 (9.61) | 38.05 (12.60) | 31.66 (9.56) | 31.21 (9.39) | 233.43\*\*\* |
| Number of Weeks Assessed | | 16.29 (12.08) | 35.42 (16.02) | 11.03 (5.94) | 15.19 (6.81) | 1185.5\*\*\* |
| RoC\*RoI | | 0.64 (0.18) | 0.38 (0.23) | 0.57 (0.21) | 0.62 (0.17) | 1001.1\*\*\* |
| Baseline Stable | | 7.31 (2.36) | 5.42 (2.33) | 7.36 (2.53) | 6.70 (2.52) | 505.28\*\*\* |
| Baseline Acute | | 6.91 (2.29) | 4.94 (2.04) | 7.65 (2.52) | 4.84 (2.26) | 660.34\*\*\* |
| Baseline Protect | | 5.28 (2.32) | 6.80 (2.23) | 5.25 (2.42) | 5.83 (2.31) | 356.02\*\*\* |
| Change Stable | | -0.42 (2.23) | -1.32 (2.37) | -1.66 (2.53) | 0.82 (2.32) | 220.91\*\*\* |
| Change Acute | | -0.96 (2.30) | -1.64 (2.31) | -4.06 (2.02) | 3.05 (1.95) | 515.18\*\*\* |
| Change Protect | | 0.52 (2.20) | 1.54 (2.27) | 1.71 (2.45) | -0.30 (2.16) | 266.36\*\*\* |
| Mean Net Change Stable | | 0.32 (0.63) | 0.12 (0.22) | 0.43 (0.86) | 0.44 (0.65) | 88.14\*\*\* |
| Mean Net Change Acute | | 0.47 (0.57) | 0.24 (0.28) | 0.72 (0.77) | 0.84 (0.80) | 404.16\*\*\* |
| Mean Net Change Protect | | 0.32 (0.67) | 0.13 (0.18) | 0.40 (0.05) | 0.44 (0.67) | 74.74\*\*\* |
|  | | N (%) | | | | Pearson’s χ2 |
| Any Recidivism | | 1180 (73.20) | 141(8.04) | 129 (72.88) | 85 (81.73) | 1609.6\*\*\* |
| Technical Violations | | 843 (52.30) | 95 (5.42) | 102 (57.63) | 68 (65.38) | 1004.6\*\*\* |
| Nonviolent Criminal Recidivism | | 340 (21.09) | 24 (1.37) | 21 (11.86) | 22 (21.15) | 340.36\*\*\* |
| Violent Recidivism | | 206 (12.78) | 23 (1.31) | 28 (15.82) | 11 (10.58) | 183.85\*\*\* |

*Note. N* = 3648 participants, assigned to groups based on posterior probabilities.

RoC\*RoI = Risk of Reconviction\* Risk of Reimprisonment (Bakker et al., 1999)

DRAOR = Dynamic Risk Assessment for Offender Re-entry (Serin, 2007); Stable = DRAOR Stable subscale (0-12 points possible); Acute = DRAOR Acute subscale (0-14 points possible); Protect = DRAOR Protect subscale (0-12 points possible)

Baseline refers to the assessment closest to time of return from incarceration.

\*\*\* *p*-value < 0.001

**Table 3.**

Predictive discrimination and calibration of DRAOR Acute using selected joint latent class model and equivalent model without latent class structure.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Prediction Window | | | | | |
|  | 4 weeks through 12 weeks | | 12 weeks through 20 weeks | | 24 weeks through 32 weeks | |
| Model | AUC\*100 | Brier Score\*100 | AUC \*100 | Brier Score\*100 | AUC \*100 | Brier Score\*100 |
| Four class JLCM | 73.23 | 11.51 | 69.21 | 13.57 | 74.49 | 9.94 |
| Equivalent SREM |  |  |  |  |  |  |